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IS 14144 (1994): electric coffee makers (Superseding IS 5160) [ETD 32: Electrical Appliances]

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भारतीय मानक
बिजली का काफी बनाने का यंत्र

Indian Standard
ELECTRIC COFFEE MAKERS

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NEW DELHI 110002

April 1994 **Price Group 3**

Electrical Appliances Sectional Committee, ET 32

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Electrical Appliances Sectional Committee had been approved by the Electrotechnical Division Council.

This standard covers general safety and performance requirements of electric coffee makers for household and similar use.

As per the decision of the third meeting of Electrotechnical Division Council, a separate safety standard on appliances for heating liquids has been brought out. In this composite standard instead of giving the details of safety requirements, reference has been made to safety standard, IS 302-2-15 (1993). The details of the safety requirements are given in IS 302-2-15 (1993).

In this standard, general safety and performance requirements of various types of coffee makers in addition to coffee percolators have been covered. This standard, when published, shall supersede IS 3514 : 1966 'Specification for electric coffee percolators (non-regulator type)', the requirement of which has been covered in this standard.

In this standard, the performance requirements are in line with IEC Publication 661 (1980). Even though the specific requirements of some of the performance measurements have not been specified; however, it is intended to specify the same at a later date depending upon the feedback and experience in this area. The purpose of specifying the method cf measurement of performance is to state and define the principal performance characteristics of electric coffee makers, which are of interest to the user and to describe the standard methods for measuring these characteristics.

While preparing this standard, assistance has been derived from IEC Pub 661 (1980) 'Methods for measuring the performance of electric household coffee makers' and IEC Pub 335-1 (1976) 'Safety of household and similar electrical appliances: Part 1 General requirements' issued by the International Electrotechnical Commission.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 MAY 2002
TO
IS 14144 : 1994 ELECTRIC COFFEE MAKERS

(*Second cover page and pages* 1, 4 *and* 5) — Substitute 'IS 302-2-206 (1994)' *for* 'IS 302-2-15 (1993)' wherever it appears.

(*Page* 4, *clause* **27.1**, *first sentence*) — Substitute the following for the existing sentence:

'The tests specified in Table 1 shall constitute the type tests and shall be carried out on one sample selected preferably at random from regular production lot.'

(*Page* 4, *clause* **27.1.1**, *line* 1) — Substitute 'The sample' for 'Both samples'.

(ETD 32)

Reprography Unit, BIS, New Delhi, India

Indian Standard

ELECTRIC COFFEE MAKERS

1 SCOPE

1.1 This standard covers the general safety and performance requirements and methods of tests for electric coffee makers and brewers with heating elements of the following types, designed for connection to suppliers at voltage not exceeding 250 V ac single phase 50 Hz or dc, and without any controlling devices:

a) Immersion heating elements,
b) Clamp on heating elements, and
c) Cast in heating elements.

1.1.1 Examples of coffee makers are:

— Coffee percolators,

— Filter coffee maker,

— Expresso coffee maker.

1.2 It does not apply to vessels having removable thermostatic control units on energy regulators nor to vessels normally operated at internal pressure of more than 0·15 kgf/cm^2.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
302-1 (1979)	Safety of household and similar electrical appliances: Part 1 General requirements (*fifth revision*)
302-2-15 (1993)	Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 15 Appliances for heating liquids

3 TERMINOLOGY

3.1 Clause **2** of IS 302-2-15 (1993) shall apply.

4 GENERAL REQUIREMENTS

4.1 Clause **3** of IS 302-2-15 (1993) shall apply.

5 GENERAL NOTE ON TESTS

5.1 Clause **4** of IS 302-2-15 (1993) shall apply.

6 RATING

6.1 Clause **5** of IS 302-2-15 (1993) shall apply.

7 CLASSIFICATION

7.1 Clause **6** of IS 302-2-15 (1993) shall apply.

8 MARKING

8.1 Clause **7** of IS 302-2-15 (1993) shall apply.

8.2 In addition to the marking requirements given under 7 of IS 302-2-15 (1993), the coffee maker shall also be marked with the following:

— Thermal efficiency.

8.2.1 In case the thermal efficiency marked on the coffee makers is more than that specified in **25.2**, a tolerance of –10 percent shall be allowed on this value subject to the provision that the actual efficiency shall, in no case, fall below the values given in **25.2**.

9 SAFETY REQUIREMENTS

9.1 The electric coffee makers shall comply with the requirements given in **8** to **32** of IS 302-2-15 (1993).

10 GRINDING DEGREES

10.1 For the purpose of performance testing of coffee makers, the grinding degrees are defined as follows:

Mesh Size of Sieve (mm)		*Coarse*	*Medium*	*Fine*
Passes	Remains	(*Percent of Total Quantity*)		
—	1·4	2	—	—
1·4	1·0	23	10	1
1·0	0·71	37	34	20
0·71	0·5	23	31	38
0·5	0·355	8	14	24
0·355	0·25	4	6	10
0·25	—	3	5	7

NOTE — The mesh sizes are based on the ISO standards.

11 LIST OF MEASUREMENTS AND TESTS

11.1 The following measurements and tests shall be carried out on the electric coffee makers:

- — Overall dimensions (**13**);
- — Mass (**14**);
- — Length of flexible cord (**15**);
- — Quantity of coffee produced with maximum quantity of cold water (**16**);
- — Quantity of coffee produced with minimum quantity of cold water (**17**);
- — Time to prepare maximum quantity of coffee (**18**);
- — Time to prepare minimum quantity of coffee (**19**);
- — Temperature of the coffee (**20**);
- — Measurement with maximum quantity of ground coffee (**21**);
- — Temperature of the supporting surface (**22**);
- — Endurance (**23**);
- — Finish (**24**);
- — Thermal efficiency (**25**); and
- — Test for thermal cutout and thermal shock (**26**).

12 GENERAL CONDITIONS FOR THE MEASUREMENTS

12.1 Unless otherwise specified the measurements are made under the following conditions:

- — Ambient temperature: 27 ± 5°C
- — Cold water temperature 22 ± 1°C
- — Input: Rated output
- — Test room: Substantially draught-free
- — Placing of the appliance: On a black matt painted wooden support, projecting beyond the appliance by at least 50 mm on all sides, at least 30 cm from the walls.

For the measurements of **16** to **21**, a support with thermocouples is used consisting of a plywood board 20 mm thick and painted matt black. At intervals of 50 mm, copper disks 15 mm in diameter and 1 mm thick are embedded so that they are flush with the surface. The outer side of the disks is blackened and on the inner side fine-wire thermocouples are fastened.

13 OVERALL DIMENSIONS

13.1 The maximum overall dimensions — height, length and width or diameter — are measured and indicated in millimetres. Handles and any projection on the appliance itself are taken into account including control knobs, the cord guard of any flexible cord and the appliance connector of any cord set supplied together with the appliance.

The overall dimensions shall be as declared by the manufacturers.

14 MASS

14.1 The mass of the appliance with flexible cord, if attached, is measured and indicated in kilogrammes to the nearest 0·05 kg.

The mass shall not exceed the value declared by the manufacturer.

15 LENGTH OF THE FLEXIBLE CORD

15.1 The distance between the entry points into the appliance and the plug, including any cord guard, is measured and indicated in metres rounded downwards to 0·05 m and shall not be less than 2 m if supplied with a plug. In the event of appliances being supplied without a plug the length of the supply cord shall be not less than 2·05 m.

16 QUANTITY OF COFFEE PRODUCED WITH MAXIMUM QUANTITY OF COLD WATER

16.1 The water container is filled with the maximum quantity of cold water as assigned to the appliance by markings, labels, advertising leaflets or similar instructions of the manufacturer. In the absence of such instructions, the water container is filled with the maximum quantity of cold water possible for normal practice.

The ground coffee container is filled according to the instructions. In the absence of such instructions, it is filled with 50 g per litre of water. The filter is arranged according to the instructions.

For this test, medium grind should be used, unless otherwise specified by the manufacturer's instructions.

16.1.1 The coffee maker is operated, any strength control being set to its maximum, unless otherwise specified by the manufacturer, until:

- — in the case of filter types, the moment at which the period between two drops falling consecutively into the coffee container is 2 s;
- — in the case of percolators with strength control, this device operates and after this to that moment at which the period between two drops falling consecutively into the coffee container is 2 s; and

- in the case of other percolators, the appliance is disconnected from the supply 8 min after percolation has started and left then up to that moment at which the period between two drops falling consecutively into the coffee container is 2 s.

16.2 The quantity of coffee produced is measured and indicated in litres rounded off to 0·05 l.

The quantity of coffee produced shall not vary by more than 10% of the value declared by the manufacturer.

17 QUANTITY OF COFFEE PRODUCED WITH MINIMUM QUANTITY OF COLD WATER

17.1 A further test is made under the conditions of **16**, but with the minimum quantity of water as stated in the manufacturer's instructions, and the corresponding quantity of ground coffee. In the absence of instructions, the test is made with 0·3 l water.

17.1.1 It is stated whether the coffee percolator functions properly under these conditions and the quantity of coffee produced is measured and indicated in litres rounded off to 0·05 l.

The quantity of coffee produced shall not vary by more than 10 percent of the value declared by the manufacturer.

18 TIME TO PREPARE MAXIMUM QUANTITY OF COFFEE

18.1 During the test of **16**, the total operation time is measured and indicated in minutes, rounded to the nearest half minute.

18.1.1 The time to prepare maximum quantity of coffee shall be as declared by the manufacturer.

19 TIME TO PREPARE MINIMUM QUANTITY OF COFFEE

19.1 During the test of **17**, the total operation time is measured and indicated in minutes, rounded to the nearest half minute.

19.1.1 The time to prepare minimum quantity of coffee shall be as declared by the manufacturer.

20 TEMPERATURE OF THE COFFEE

20.1 At the end of the test according to **16**, the temperature of the coffee produced is measured in the centre of the lower half of the liquid by means of a watertight thermocouple or equivalent device.

In the case of coffee percolators with provisions to keep coffee hot, half of the quantity is then poured out.

In the case of filter type coffee percolators, the filter with the ground coffee is removed and replaced by a lid, if any.

The coffee container is put on the warming device again. The temperature of the liquid is measured again after 30 min and after 60 min. The three temperatures measured are indicated in degrees Celsius with the corresponding times. In the case of a thermostatically controlled warming part, the temperature in the centre of the coffee is recorded during 60 min and the average temperature, in degrees Celsius, is indicated together with the difference of the maximum and the minimum temperature determined.

20.2 The average temperature and difference of maximum and minimum temperature in the centre shall be as declared by the manufacturer.

21 MEASUREMENT WITH MAXIMUM QUANTITY OF GROUND COFFEE

21.1 The test of **16** is repeated, however with the maximum quantity of ground coffee possible, according to the instructions of the manufacturer.

It is determined and stated whether the ground coffee container (filter) may hold this maximum quantity or whether it has overflowed or the filter paper has been perforated.

Compliance is checked by inspection.

22 TEMPERATURE OF THE SUPPORTING SURFACE

22.1 The coffee percolator is placed on the supporting surface described in **12** in such a manner that parts of the appliance for which high temperatures may be expected may touch or be close to the disks. The temperature of the disks is recorded and the maximum value obtained is stated in degrees Celsius.

The temperature of the supporting surface shall not vary by more than 10 percent of the value declared by the manufacturer.

NOTE — This measurement is made during the tests of **16** to **21**.

23 ENDURANCE

23.1 The coffee maker is filled to 80 percent of the rated water capacity. It is connected to the supply such that the input is 1·1 times the maximum rated input which is maintained throughout the test. The coffee maker is operated under these conditions for 96 hours. Occasional addition of water to compensate evaporation losses is recommended.

NOTE — If any appreciable scaling is formed due to heating of hand water, it shall be cleaned before continuing the test to avoid the risk of failure heating element due to scaling.

23.2 After the test of **23.1** the coffee maker shall withstand the test of **16.4** of IS 302-1 (1979).

24 FINISH

24.1 The external finish used on metal components shall be of a heat and moisture resisting nature and shall not be adversely affected by variations in temperatures occurring under normal operating conditions, or by the endurance test (*see* **22**).

25 TEST FOR THERMAL EFFICIENCY

25.1 The coffee maker is filled with water corresponding to its rated capacity and is allowed to stand for a period of 15 minutes in a room free from draught and the temperature of water noted. It is then switched on with the circuit adjusted to give rated input till the water temperature is nearly 50°C above the initial temperature of water. The period, for which the supply is connected, shall be noted. The maximum temperature attained by the water shall also be measured and the thermal efficiency shall be computed.

25.2 The thermal efficiency shall be not less than 85 percent for electric coffee maker incorporating immersion type heating elements and 65 percent for electric coffee percolators incorporating other types of heating elements.

26 TEST FOR THERMAL CUT-OUT AND THERMAL SHOCK

26.1 For coffee maker with safety devices in the form of non-self-resetting cut-outs and connector ejectors, two tests shall be made, the coffee maker being filled each time with a sufficient quantity of water to cover the heating element in the case of immersion type heating elements, or to a depth of 15 mm in the case of clamp-on type heating elements. It is then switched on until the safety device operates and cold water poured into the coffee maker suddenly. The coffee maker shall then be allowed to cool to room temperature and the cut-out device re-set by the means provided. Two further tests shall then be made, the coffee maker being switched on without any water in it and allowing the thermal cut-out to operate, cold water being poured into the coffee percolators suddenly after each operation of the cut-out and the coffee maker allowed to cool to room temperature.

26.1.1 During the tests of **26.1**, the safety device shall operate before danger is caused to the coffee percolator. Tarnishing of coffee percolator and the heating elements and damage to washers, if any, shall be neglected.

27 TESTS

27.0 Categories of Tests

Tests are classified as type, acceptance and routine tests.

27.1 Type Tests

The tests specified in Table 1 shall constitute the type tests and shall be carried out on two samples of coffee makers of the same type and rating selected preferably at random from a regular production lot. Before commencement of the tests, the coffee makers shall be visually examined and inspected for obvious visual defects in respect of components, parts and their assembly, construction, mechanical hazards, markings, provision of suitable terminals for supply connections, earthing and the effectiveness of screws and connections. The external surface finish shall be even and free from finishing defects.

Table 1 Schedule of Type Tests

Sl No.	Test	Clause Reference
1.	Safety requirements	8 to 32 of IS 302-2-15 (1993)
2.	Overall dimensions	13
3.	Mass	14
4.	Length of flexible cord	15
5.	Quantity of coffee produced with maximum quantity of cold water	16
6.	Quantity of coffee produced with minimum quantity of cold water	17
7.	Time to prepare maximum quantity of coffee	18
8.	Time to prepare minimum quantity of coffee	19
9.	Temperature of the coffee	20
10.	Measurement with maximum quantity of ground coffee	21
11.	Temperature of supporting surface	22
12.	Endurance	23
13.	Finish	24
14.	Test for thermal efficiency	25
15.	Test for thermal cutout and thermal shock	26

27.1.1 *Criteria for Acceptance*

Both samples shall successfully pass all the type tests for proving conformity with the requirements of the standard. If any of the samples fails in any of the type tests, the testing authority, at its discretion, may call for fresh samples not exceeding twice the original number and subject them again to all tests or to the test(s) in which failure(s) had occurred. No failure should be permitted in the repeat test(s).

27.2 Acceptance Tests

The following shall constitute the acceptance tests:

Test	*Clause Reference*
a) Protection against electric shock	8 of IS 302-2-15 (1993)
b) Input	10 of IS 302-2-15 (1993)
c) Temperature rise	11 of IS 302-2-15 (1993)
d) Insulation resistance and electric strength at operating temperature	13 of IS 302-2-15 (1993)
e) Moisture resistance	15 of IS 302-2-15 (1993)
f) Insulation resistance and electric strength (after humidity treatment)	16 of IS 302-2-15 (1993)
g) Provision for earthing	27 of IS 302-2-15 (1993)

27.2.1 A recommended sampling procedure for acceptance tests is given in Appendix B of IS 302-1 (1979).

27.3 Routine Tests

The following shall constitute the routine tests:

Test	*Clause Reference*
a) Protection against electric shock	8 of IS 302-2-15 (1993)
b) High voltage	13.2.2 of IS 302-1 (1979)
c) Provision for earthing	27 of IS 302-2-15 (1993)

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